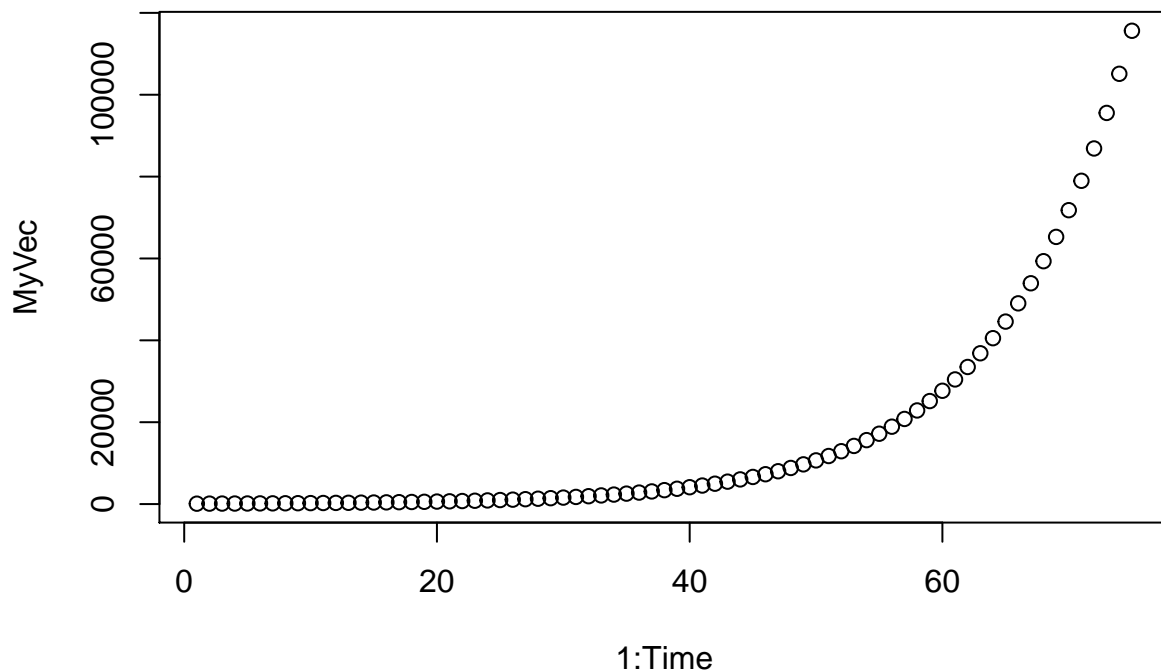# Lecture #11

Nicholas J. Gotelli

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Improving functions

```
Growth1 <- function(N_0=100,r=0.1,Time=75){
  MyVec <- rep(0,Time)
  MyVec[1] <- N_0
  for (i in 2:Time){
    MyVec[i] <- MyVec[i - 1] +r*MyVec[i - 1]
  }
  plot(x=1:Time,y=MyVec)
  return(MyVec)
}
Growth1()
```



```
##  [1]    100.0000    110.0000    121.0000    133.1000    146.4100
##  [6]    161.0510    177.1561    194.8717    214.3589    235.7948
## [11]    259.3742    285.3117    313.8428    345.2271    379.7498
## [16]    417.7248    459.4973    505.4470    555.9917    611.5909
```

```
## [21]      672.7500     740.0250     814.0275     895.4302     984.9733
## [26]     1083.4706    1191.8177    1310.9994    1442.0994    1586.3093
## [31]     1744.9402    1919.4342    2111.3777    2322.5154    2554.7670
## [36]     2810.2437    3091.2681    3400.3949    3740.4343    4114.4778
## [41]     4525.9256    4978.5181    5476.3699    6024.0069    6626.4076
## [46]     7289.0484    8017.9532    8819.7485    9701.7234   10671.8957
## [51]    11739.0853   12912.9938   14204.2932   15624.7225   17187.1948
## [56]    18905.9142   20796.5057   22876.1562   25163.7719   27680.1490
## [61]    30448.1640   33492.9803   36842.2784   40526.5062   44579.1568
## [66]    49037.0725   53940.7798   59334.8578   65268.3435   71795.1779
## [71]    78974.6957   86872.1652   95559.3818  105115.3200  115626.8519
```

```r
Growth2 <- function(N_0=100,r=0.1,Time=75,ret=TRUE){
  MyVec <- rep(0,Time)
  MyVec[1] <- N_0
  for (i in 2:Time){
    dNdt <- r*MyVec[i - 1]
    MyVec[i] <- MyVec[i - 1] + dNdt
  }
  plot(x=1:Time,y=MyVec)
  if(ret==TRUE) return(MyVec)
}
Growth2(ret=FALSE)
```